

where,

ERP<sub>T</sub>: effective isotropic radiated power at the terrestrial transmitter (dBm)

FSL: free space loss between the terrestrial transmitter and the terrestrial receiver (dB).

G: main beam gain of the terrestrial receive antenna (dBi).

FL: fixed losses at the terrestrial receiver (dB).

Subtracting equation (2-14) from (2-15), we obtain the carrier-to-interference power ratio,

$$C-I_R = ERP_T - FSL + (G - G_R) + 134.5 - 10 \log(\lambda^2/4\pi) - 10 \log(B/4) \text{ (dB)} \quad (2-16)$$

Note that  $(G - G_R)$  is the directivity (D) of the terrestrial antenna in dB towards the satellite. Equation (2-14) could be re-written as:

$$I_R = -134.5 + (G - D) + 10 \log(\lambda^2/4\pi) - FL + 10 \log(B/4) \text{ (dB)} \quad (2-17)$$

All of our analyses assumed  $D = 0$ .

#### 2.1.3.2 Derivation of Interference Power and Desired Carrier Power Levels

Since the Globalstar satellite has a varying PFD with elevation angle, we need to determine the worst case elevation angle at which the combination of terrestrial antenna gain and the Globalstar satellite flux density give the highest interference power. These analyses have to incorporate the elevation angle from the terrestrial receiving antenna towards the paired terrestrial transmitting antenna. We shall assume that the satellite will pass along the same pointing azimuth as that linking the terrestrial receiver and transmitter.

The following observations apply to parabolic terrestrial antennas.

We can segment the analysis into two parts:

1. When the terrestrial antenna is tilted downwards.

Under this condition the largest  $I_R$  occurs when the Globalstar satellite's PFD is at  $-173.5 \text{ dBW/m}^2/4 \text{ kHz}$ , i.e., engaging the terrestrial antenna over the horizon. We assumed a worst case analysis of no directivity at the terrestrial antenna, thus, utilizing the full main beam gain.

2. When the terrestrial antenna is tilted upwards.

Under this condition, will occur within the main beam of the terrestrial antenna. The corresponding PFD value at the terrestrial antenna's elevation angle is deduced from Table 1.2.1-1. Should an elevation angle fall within two values as given, we interpolate logarithmically.

Assuming the vertical parabolic antenna pattern is the same as the horizontal and the gain pattern will drop much faster than the satellite's PFD outside the main gain. Thus the main beam remains the worst case.

#### 2.1.4 Database

Comsearch maintains a regularly updated database of all licensed, applied for and prior coordinated microwave paths operating in all the frequency bands of interest. In this section of the report a typical record from the OFS database in the 6525 to 6875 MHz band is described. A data sheet stating the operational characteristic for a sample path is presented in Table 2.1.4-1. Listed below is a description of the major items of interest for this study that are designated along the right side of this sample data sheet.

<u>Item</u>	<u>Description</u>
1.	Call Sign - This field contains the station identifier as designated by the FCC.
2.	Transmit Frequency (MHz) - The center or RF carrier frequency and signal polarization (V-vertical, H-Horizontal) that is transmitted towards the associated receive station.
3.	Received Level - The calculated signal strength of the desired signal at the receive station. This calculation is based upon the transmit station EIRP, free space loss, receive antenna gain and any fixed losses (waveguide, connectors, circulator, attenuation pads, etc.) that occur between the receive antenna and the receiver.
4.	Antenna model at the transmit and receive end are Andrew model P10-65D which are 10 foot parabolic antennas.
5.	Antenna Gain - The main beam gain (43.9 dBi) of receive antenna which is used in our calculation of the interference level from the satellite and the desired receive carrier level.
6.	Tilt (degrees) - the pointing angle from the receive antenna towards the transmit antenna in either the upward or downward direction. This angle is used to calculate the power flux density which is used in the interference level assessment.
7.	Fixed losses (dB) - the fixed losses consist of any line loss between the transmitter and antenna and between the receive antenna and the receiver. The fixed losses also may include any attenuators between the transmitter and antenna or the receive antenna and the receiver.
8.	Emission Designator - 10000F9 emission designator indicates that the transmitter requires 10 MHz of Bandwidth and the signal is analog with frequency modulation.
9.	Bandwidth in (MHz) is used in the determination of the

amount of interference from the satellite that is received by the terrestrial receiver. For message FM/FDM traffic the received bandwidth is assumed to be two times the transmitter bandwidth or 20 MHz in this case.

10. Radio type model number and FCC Code.
11. Channel Loading - 600 channel message (FM/FDM) is being transmitted between WNEJ548 and WNEJ547.

COMSEARCH  
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Reston, Virginia 22091  
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04/07/94

MICROWAVE PATH DATA

ITEM NO.

<u>STATION NAME</u>	OQUIRRH SC	UT	LEWIS PEAK	UT	
PATH STATUS	LICENSE OR CP				
CALL SIGN	WNEJ548		WNEJ547		1
OWNER CODE	S73900		S73900		
LATITUDE (D-M-S)	40 40 53.0		40 51 19.0		
LONGITUDE (D-M-S)	112 1 38.0		111 28 47.0		
GND ELEV (FT/M-AMSL)	4450/1356		9304/2836		
PATH AZ (DEG)	67.150		247.507		
PATH DIST (MI/KM)		31.129/ 50.097			
 <u>ANTENNA</u>					
<u>PRIMARY</u>	TX	ANDREW CORPORATION	ANDREW CORPORATION		
		PL10-65D	PL10-65D		4
FCC CODE					
GAIN (dBi)	43.9		43.9		5
C/L (FT/M-AGL)	75 23		30 9		
TILT (DEG)	1.5071 UP		1.8448 DOWN		6
<u>PRIMARY</u>	RX	SAME AS			
		TRANSMIT ANTENNA			
FCC CODE					
GAIN (dBi)					
C/L (FT/M-AGL)					
<u>DIVERSITY</u>					
FCC CODE					
GAIN (dBi)					
C/L (FT/M-AGL)					
 <u>EQUIPMENT</u>					
		HARRIS CORPORATION	HARRIS CORPORATION		
		BCK90KFE-8303-02	BCK90KFE-8303-02		10
FCC CODE		FAS602	FAS602		
EMISSION		10000F9	10000F9		8,9
LOADING		600 CH MS0	600 CH MS0		11
STABILITY (%)		0.005000	0.005000		
POWER (DBM)		31.0	31.0		
RECEIVED LEVEL (DBM)	-29.2		-29.2		3
EIRP (DBM)	71.9		72.9		
FIXED LOSSES (DB)	3.0		2.0		7
FREE SPACE LOSS (DB)		143.0			
TRANSMIT	6835.000H		6675.000H		2
FREQUENCIES (MHZ)					

TABLE 2.1.4-1 PATH PARAMETERS

### 2.1.5 Data Analysis and Determination of Carrier Power-to-Interference Power Levels

The data is analyzed on a case by case basis and data from a typical duplex path is presented in Table 2.1.5-1 to calculate the carrier-to-interference power levels. Items 1 through 11 are defined in Section 2.1.4.

The following calculations are required for the corresponding items in Table 2.1.5-1.

12. Interference Power Level - Calculated interference level is based on the receive bandwidth and the strength of the interfering signal in that bandwidth as well as the receive power flux density, the gain of receive antenna, G, and the fixed losses. Substituting the corresponding values in equation 2-14 of Section 2.1.3 and utilizing a receiver bandwidth of 20 MHz the receiver power is -94.6 dBm at WNEJ548 and -93.6 dBm at WNEJ547.
13. C/I level - The calculated C/I is equal to the carrier Item 3 over the interference level Item 12 i.e.  $-29.2 - (-94.6)$  or 65.4 dB at WNEJ548 and  $-29.2 - (-93.6)$  or 64.4 dB at WNEJ547.
14. Flux density based on Tilt Angle - The flux density has been adjusted for an elevation angle of 1.5 degrees upward at WNEJ548 or -172.8 dBW/m<sup>2</sup>/4 kHz and of 1.8 degrees downward at WNEJ547 or -173.5 dBW/m<sup>2</sup>/4 kHz. The adjustment was logarithmically interpolated.
15. Interference Adjustment - Interference adjustment factor is the difference between the satellites power flux density of -164.5 dBW/m<sup>2</sup>/4 kHz and the actual power flux density in Item 14. Thus, the adjustment is  $(-172.8) - (-164.5)$  equal to 8.3 dB at WNEJ548 and  $(-173.5) - (-164.5)$  equal to 9.0 dB at WNEJ547.
16. Adjusted C/I Level - The adjusted C/I ratio is the actual C/I level Item 13 plus the interference adjustment factor, Item (15). Thus we expect  $65.4 + 8.3 = 73.7$  dB at WNEJ548 and  $64.4 + 9.0 = 73.4$  dB at WNEJ 54.7.

Table 2.1.5-2, presents a sample of the case analysis list established for Salt Lake, City. A description of column headings precedes the table. The data presented in Table 2.1.5-1 for the WNEJ548 to WNEJ547 is noted in Table 2.1.5-2 as NEJ548 to NEJ547 due to limitation in field width on output.

TABLE 2.1.5-1  
DETERMINATION OF CARRIER-TO-INTERFERENCE  
LEVEL (dB) OPERATIONAL - FIXED

(1)	Call Sign	WNEJ548	WNEJ547
(2)	Transmit Frequency (MHz)	6835	6675
(3)	Received Carrier-C (dBm)	-29.2	-29.2
(4)	Antenna Model		
(5)	Antenna Gain-G (dBi)	43.9	43.9
(6)	Antenna Tilt Angle (degrees)	1.5 up	1.8 down
(7)	Line Losses equal to Fixed Losses (FL) (dB)	3.0	2.0
(8)	Emission Designator	10000F9	10000F9
(9)	Bandwidth (MHz)	20	20
(10)	Equipment	Analog	Analog
(11)	Loading	600 Channel Message	600 Channel Message
(12)	Interference Power Level (dBm)	-94.6	-93.6
(13)	C/I Level for maximum flux density Item (3) - Item (12)	65.4	64.4
(14)	Actual Flux density based on Tilt Angle dBW/4 kHz	-172.8	-173.5
(15)	Interference Adjustment (dB) (Maximum Flux Density - Actual Density)	8.3	9.0
(16)	Adjusted C/I Level (dB) Item (13) + Item (15)	73.7	73.4

Column Heading of Summary Table 2.1.5-2

Record Number -	File Number where path data can be located
Call Sign -	Victim Receiver License
Frequency (MHz) -	Frequency used in analysis of interference levels
Carrier-C (dBm) -	Receive signal level at terrestrial receiver
Antenna Type -	FCC Antenna Code
Tilt Angle (Degrees) -	Direction victim receiver is pointing with respect to source of desired signal
Gain (dBi) -	Gain of receive antenna
LL -	LL equal to FL, which is used in analysis to determine carrier level and interference level
Emission Designator -	Emission Designator as defined in FCC Rules Part 2.201
Bandwidth (BW (kHz) -	Bandwidth used to evaluate interference into the victim receiver
Equipment Code -	Code assigned by FCC to transmitter equipment
Loading -	Number of channels and type traffic being carried
Interference-I (dBm) -	Predicted interference from Globalstar system
C/I (dBm) -	Predicted carrier-to-interference level based on analysis for minimum flux density into victim receiver
Power Flux Density -	Actual Power flux density from Globalstar satellite base don pointing angle of victim receiver
Adjusted Interference -I(dB)-	The amount by which the interference level is reduced at the victim receiver bases on actual flux density
Adjusted C/I (dB) -	The actual predicted analog carrier-to-interference land at the victim receiver
Final C/I (dB) -	The actual predicted analog digital interference level at the victim receiver

TABLE 2.1.5-2

## Summary of Typical Interference Levels 6525 - 6875 MHz Band

## Salt Lake City, Utah

Rec. Num.	Call Sign	Freq. (MHz)	C (dBm)	Antenna Type	Tilt (Deg.)	Ang. (Deg.)	Gain (dBi)	LL (dB)	Emission Desig.	Bw (KHz)	Equip. Code	Loading	I (dBm)	C/I (dB)	Pwr.Flx (dBW/4KHz)	Adj. I (dB)	Adj. C/I (dB)
38.	KCU44	6725.0	-30.9	A64006	1.2	DOWN	45.8	1.0	10000F9	20000	2PSP01	600 CH MSG	-90.7	59.8	-173.5	9.0	68.8
36.	KCU44	6725.0	-33.6	M54009	3.2	DOWN	42.4	1.0	10000F9	20000	2YH101	600 CH MSG	-94.1	60.5	-173.5	9.0	69.5
11.	KCU44	6725.0	-31.6	M65000	0.9	DOWN	43.9	1.0	10000F9	20000	2GX901	600 CH MSG	-92.6	61.0	-173.5	9.0	70.0
102.	MEG938	6725.0	-33.2	A64350	0.6	DOWN	42.3	1.0	10000F9	20000	2YH101	600 CH MSG	-94.2	61.0	-173.5	9.0	70.0
102.	WCU78	6725.0	-33.2	A64130	0.2	UP	42.3	1.0	10000F9	20000	2YH101	600 CH MSG	-94.2	61.0	-173.4	8.9	70.0
75.	WIA956	6725.0	-32.7	A64130	0.1	DOWN	42.3	1.0	10000F9	20000	2YH101	600 CH MSG	-94.2	61.5	-173.5	9.0	70.5
75.	MAT673	6725.0	-32.7	A64130	0.3	DOWN	42.3	1.0	10000F9	20000	2YH101	600 CH MSG	-94.2	61.5	-173.5	9.0	70.5
3.	KCU44	6725.0	-29.1	A64006	0.1	UP	45.8	1.0	10000F9	20000	2GX901	600 CH MSG	-90.7	61.6	-173.5	9.0	70.6
117.	KPM97	6725.0	-29.1	G64700	9.0	UP	42.0	1.0	10000F9	20000	2PSP01	600 CH MSG	-94.5	65.5	-169.8	5.3	70.8
41.	KRA57	6725.0	-29.9	A64130	0.3	UP	42.3	0.0	10000F9	20000	28WF01	600 CH MSG	-93.2	63.3	-173.4	8.9	72.2
41.	KDB60	6725.0	-29.9	A64130	0.7	DOWN	42.3	0.0	10000F9	20000	28WF01	600 CH MSG	-93.2	63.3	-173.5	9.0	72.3
3.	KCU45	6725.0	-29.1	M87408	0.7	DOWN	44.0	1.0	10000F9	20000	2GX901	600 CH MSG	-92.5	63.4	-173.5	9.0	72.4
106.	NEJ545	6725.0	-31.0	A64170	0.4	DOWN	42.3	2.0	10000F9	20000	FAS602	600 CH MSG	-95.2	64.2	-173.5	9.0	73.2
80.	NEJ547	6725.0	-29.2	A65170	1.8	DOWN	43.9	2.0	10000F9	20000	FAS602	600 CH MSG	-93.6	64.4	-173.5	9.0	73.4 *
80.	NEJ548	6725.0	-29.2	A65170	1.5	UP	43.9	3.0	10000F9	20000	FAS602	600 CH MSG	-94.6	65.4	-172.8	8.3	73.7 *
109.	NEJ544	6725.0	-30.5	A64170	0.2	DOWN	42.3	2.0	10000F9	20000	FAS602	600 CH MSG	-95.2	64.7	-173.5	9.0	73.7
109.	KTA74	6725.0	-30.5	A64170	0.1	DOWN	42.3	2.0	10000F9	20000	FAS602	600 CH MSG	-95.2	64.7	-173.5	9.0	73.7
99.	NEJ545	6725.0	-30.4	A64170	2.0	DOWN	42.3	2.0	10000F9	20000	FAS602	600 CH MSG	-95.2	64.8	-173.5	9.0	73.8
38.	KPM58	6725.0	-27.9	G64700	0.9	UP	42.0	1.0	10000F9	20000	2PSP01	600 CH MSG	-94.5	66.6	-173.1	8.6	75.2
127.	KES28	6725.0	-28.7	G64700	0.4	UP	42.0	2.0	10000F9	20000	2PSP01	600 CH MSG	-95.5	66.9	-173.3	8.8	75.7
74.	WAI722	6725.0	-26.0	A64130	2.9	UP	42.3	2.0	10000F9	20000	2YH101	600 CH MSG	-95.2	69.2	-172.2	7.7	76.9
78.	WIA956	6725.0	-25.4	A64130	1.7	DOWN	42.3	0.0	10000F9	20000	28WF01	600 CH MSG	-93.2	67.9	-173.5	9.0	76.9
78.	KRA57	6725.0	-24.4	A64130	1.5	UP	42.3	0.0	10000F9	20000	28WF01	600 CH MSG	-93.2	68.9	-172.8	8.3	77.1
74.	WIA956	6725.0	-26.0	A64130	3.0	DOWN	42.3	1.0	10000F9	20000	2YH101	600 CH MSG	-94.2	68.2	-173.5	9.0	77.2
138.	NEP263	6725.0	-36.5	A63130	0.1	DOWN	39.7	9.0	10000F9	20000	FAS600	600 CH MSG	-104.8	68.3	-173.5	9.0	77.3
107.	NEJ545	6725.0	-32.1	A63130	2.8	DOWN	39.7	6.0	10000F9	20000	FAS602	600 CH MSG	-101.8	69.7	-173.5	9.0	78.7
122.	NEJ546	6725.0	-27.1	A63170	1.8	UP	39.8	2.0	10000F9	20000	FAS602	600 CH MSG	-97.7	70.6	-172.7	8.2	78.8
108.	NEJ550	6725.0	-30.8	A64170	0.9	UP	42.3	8.0	10000F9	20000	FAS602	600 CH MSG	-101.2	70.4	-173.1	8.6	79.0
106.	NEJ544	6725.0	-31.0	A64170	0.2	UP	42.3	8.0	10000F9	20000	FAS602	600 CH MSG	-101.2	70.2	-173.4	8.9	79.1
81.	KOR85	6725.0	-25.7	A64170	0.3	UP	42.3	3.0	10000F9	20000	FAS602	600 CH MSG	-96.2	70.6	-173.4	8.9	79.4
108.	NEJ545	6725.0	-30.8	A64170	1.0	DOWN	42.3	8.0	10000F9	20000	FAS602	600 CH MSG	-101.2	70.4	-173.5	9.0	79.4
81.	NEJ548	6725.0	-25.7	A64170	0.3	DOWN	42.3	3.0	10000F9	20000	FAS602	600 CH MSG	-96.2	70.6	-173.5	9.0	79.6
122.	NEJ544	6725.0	-27.1	A63170	1.9	DOWN	39.8	2.0	10000F9	20000	FAS602	600 CH MSG	-97.7	70.6	-173.5	9.0	79.6
19.	MAT673	6725.0	-17.1	*67000	0.4	DOWN	47.1	0.0	10000F9	20000	28WF01	600 CH MSG	-88.4	71.3	-173.5	9.0	80.3
19.	MEG938	6725.0	-17.1	*67000	0.1	DOWN	47.1	0.0	10000F9	20000	28WF01	600 CH MSG	-88.4	71.3	-173.5	9.0	80.3
43.	MCP861	6725.0	-24.6	A64130	1.7	DOWN	42.3	3.0	10000F9	20000	2Z6202	600 CH MSG	-96.2	71.7	-173.5	9.0	80.7
107.	NEJ543	6725.0	-32.1	A63130	2.8	UP	39.7	12.0	10000F9	20000	FAS602	600 CH MSG	-107.8	75.7	-172.3	7.8	83.5
99.	MED722	6725.0	-30.4	A64170	1.9	UP	42.3	13.0	10000F9	20000	FAS602	600 CH MSG	-106.2	75.8	-172.6	8.1	83.9
100.	NEJ549	6725.0	-19.9	A63170	2.2	UP	39.8	2.0	10000F9	20000	FAS602	600 CH MSG	-97.7	77.8	-172.5	8.0	85.9
54.	WGC66	6725.0	-13.6	S91750	4.2	UP	42.4	1.0	10000F9	20000	FAS600	600 CH MSG	-94.1	80.5	-171.8	7.3	87.8
100.	MED722	6725.0	-19.9	A63170	2.2	DOWN	39.8	3.0	10000F9	20000	FAS602	600 CH MSG	-98.7	78.8	-173.5	9.0	87.8
54.	KOT80	6725.0	-13.6	S91750	4.2	DOWN	42.4	1.0	10000F9	20000	FAS600	600 CH MSG	-94.1	80.5	-173.5	9.0	89.5
8.	RXONLY	6725.0	-79.2	060000	0.2	DOWN	13.0	0.0		10000	999999	VIDEO	-125.5	46.3	-173.5	9.0	55.3
93.	MT VIS	6725.0	-30.3	S64200	0.0	UP	42.4	1.0		10000	999999	VIDEO	-97.1	66.8	-173.5	9.0	75.8

\* DETAILED DESCRIPTION FOR THESE CASES ARE INCLUDED IN SECTION 2.1.5.

## 2.2 Uplinks

### 2.2.1 General

In this report we will examine only the great circle (GC) interference which occurs when an interfering signal enters the terrestrial microwave antenna directly via line-of-sight or by propagation over intervening terrain.

Table 2.2.1-1 presents the typical data that is required for site analysis which includes:

- Site Latitude
- Site Longitude
- Ground Elevation
- Antenna Centerline
- Earth Station Antenna gain/size
- Frequency Band of Interest
- Uplink Power (dBW/4 kHz)
- Maximum Permissible Interference power (dBW/4 kHz)
- Satellite Arc Range (degrees)
- Azimuth Range to the Satellite
- Corresponding Elevation Angles
- Radio Climate Zone
- Radio Zone

The maximum great circle coordination distance is usually calculated based on the above parameters, but has been input as 250 km for this analysis.

### 2.2.2 Prediction of Interference Cases

Initially the interference analysis is a computerized study of the interference aspects of a site. The interference cases are predicted on a line-of-sight basis as shown in Table 2.2.2-1. The distance and azimuth from the earth station to the victim receiver and the interference margins are calculated and summarized in the output.

### 2.2.3 Resolution of Interference Cases

The next step is to construct path profiles to determine the amount of path blockage, i.e. over-the-horizon loss, that exists along the great circle interference path.

These path profiles are derived from the ground elevation contours shown on USGS topographic maps. The path loss is then determined using prediction techniques of NBS Technical Note 101, Revised. If the analysis of the path profiles indicates that marginal or unacceptable interference cases still remain, an evaluation is made of local shielding at the earth station location to attempt to resolve the cases.

SATELLITE EARTH STATION  
FREQUENCY COORDINATION DATA  
04/22/94

OWNER:	Globalstar
EARTH STATION NAME, STATE	RAPID CITY SD
LATITUDE (DMS):	44 5 0.0
LONGITUDE (DMS):	103 10 0.0
GROUND ELEVATION AMSL (FEET/METERS)	3260.0 / 993.6
ANTENNA CENTERLINE AGL (FEET/METERS)	12.0 / 3.7
TRANSMIT ANTENNA TYPE : 29 34	
6.0 GHZ GAIN (DBI)/DIAMETER (METERS):	45.4/ 3.4
3 DB/15 DB HALF BEAMWIDTH (DEG.):	0.40/0.80
OPERATING MODE:	TRANSMIT ONLY
TRANSMIT BAND (MHZ):	6525 - 6875
EMISSION DESIGNATOR	
MODULATION:	DIGITAL
MAX. AVAILABLE RF POWER (dBW/4KHZ):	-7.0
(dBW/MHZ):	17.0
MAX. EIRP (dBW/4KHZ):	38.4
(dBW/MHZ):	62.4
MAX. PERMISSIBLE INTERFERENCE POWER	
6.0 GHZ, 20% (dBW/4KHZ)	-154.0
6.0 GHZ, 0.0025% (dBW/4KHZ)	-131.0
RANGE OF SATELLITE ARC IN DEGREES (MIN/MAX):	0.0/ 359.0
AZIMUTH RANGE (MIN/MAX):	0.0/ 360.0
CORRESPONDING ELEVATION ANGLES:	10.0/ 10.0
RADIO CLIMATE:	A
RAIN ZONE:	5
MAX. GREAT CIRCLE COORDINATION DISTANCE (MI/KM)	
6.0 GHZ:	155.3 / 250.0
PRECIPITATION SCATTER CONTOUR RADIUS (MI/KM)	
6.0 GHZ:	62.1 / 100.0
NOTE: HORIZON IS LESS THAN 0.2 DEGREES AT ALL AZIMUTHS	

TABLE 2.2.1-1 EARTH STATION PARAMETERS

#### DESCRIPTION OF GREAT CIRCLE INTERFERENCE CASE HEADINGS

<b>TERRESTRIAL PATH:</b>	<b>SITE NAMES AND STATE OF THE TERRESTRIAL PATH THAT THE FIRST SITE LISTED IS THE TERRESTRIAL STATION INVOLVED IN THE INTERFERENCE CONFLICT.</b>
<b>LATITUDE:</b>	<b>LATITUDE OF THE INVOLVED TERRESTRIAL STATION.</b>
<b>LONGITUDE:</b>	<b>LONGITUDE OF THE INVOLVED TERRESTRIAL STATION</b>
<b>CALL:</b>	<b>FCC CALL SIGN OF THE INVOLVED TERRESTRIAL STATION</b>
<b>OWNER:</b>	<b>OWNER OF THE TERRESTRIAL PATH</b>
<b>GROUND ELEVATION:</b>	<b>GROUND ELEVATION (AMSL) OF THE INVOLVED TERRESTRIAL STATION</b>
<b>ACL:</b>	<b>ANTENNA CENTERLINE (AGL) OF THE INVOLVED TERRESTRIAL STATION</b>
<b>EDISCT:</b>	<b>EARTH STATION DISCRIMINATION ANGLE, IN DEGREES, TOWARD THE INVOLVED TERRESTRIAL STATION</b>
<b>TDISCT:</b>	<b>INVOLVED TERRESTRIAL STATION DISCRIMINATION ANGLE, IN DEGREES, TOWARDS THE EARTH STATION</b>
<b>GES:</b>	<b>GAIN OF THE EARTH STATION IN dBI AT THE CALCULATED EARTH STATION DISCRIMINATION</b>
<b>GTS:</b>	<b>GAIN OF THE INVOLVED TERRESTRIAL STATION IN dBI AT THE CALCULATED TDISCT</b>
<b>FSLOSS:</b>	<b>FREE SPACE PROPAGATION LOSS IN dB DUE TO THE DISTANCE BETWEEN THE EARTH STATION AND THE INVOLVED TERRESTRIAL STATION AT THE INTERFERENCE FREQUENCY</b>
<b>TANT:</b>	<b>INVOLVED TERRESTRIAL STATION ANTENNA CODE AND TYPE</b>
<b>DIST:</b>	<b>DISTANCE BETWEEN THE EARTH STATION AND THE INVOLVED TERRESTRIAL STATION IN KILOMETERS</b>
<b>AZIMUTH:</b>	<b>AZIMUTH IN DEGREES FROM TRUE NORTH FROM THE EARTH STATION TO THE INVOLVED TERRESTRIAL STATION</b>
<b>PR:</b>	<b>CALCULATED POWER RECEIVE IN dBW. PR = GES + GTS + (TPWR - 30) - FSLOSS - LL FOR RECEIVE PR = GES + GTS + PES - FSLOSS - LL FOR TRANSMIT</b>
<b>PES:</b>	<b>POWER OF EARTH STATION IN dBW/4 KHz</b>
<b>MARGIN:</b>	<b>MARGIN IN dB TO THE INTERFERENCE OBJECTIVE. THIS VALUE IS THE DIFFERENCE BETWEEN THE OBJECTIVE AND THE PR</b>
<b>TPWR:</b>	<b>TRANSMIT POWER IN dBm OF THE TRANSMIT STATION IN THE INTERFERENCE CONFLICT</b>
<b>LL:</b>	<b>LINE LOSS OF THE INVOLVED TERRESTRIAL STATION</b>
<b>LOADING:</b>	<b>TRAFFIC LOADING OF THE INVOLVED TERRESTRIAL STATION</b>
<b>PLAN:</b>	<b>FREQUENCY PLAN OF THE INVOLVED TERRESTRIAL STATION</b>
<b>FREQ POL:</b>	<b>FREQUENCIES AND POLARIZATIONS OF THE INVOLVED TERRESTRIAL STATION</b>

## GREAT CIRCLE INTERFERENCE CONFLICTS

05/02/94

EARTH STATION NAME: RAPID CITY SD

CALL:

OWNER: Globalstar

COORDINATES: 44 5 0.0 103 10 0.0

GROUND ELEVATION: 3260 FEET AMSL ACL: 12 FEET AGL

ANTENNA: REFERENCE PATTERN 29-25LOG(THETA)

OBJECTIVES: RECEIVE: 0.0 (DBW / 1 MHZ) TRANSMIT: -154.0 (DBW / 4 KHZ)

TERRESTRIAL PATH		GND	EDISCT	GES	FSLOSS	DIST	PR	TPWR	PLA
LAT	LON	CALL	ACL	TDISCT	GTS	TANT	AZ	MARGIN	LL
OWNER									
FREQ/POL		LOADING							
1	KBHE TV BLDGSDCAMP RAPID SD	3836.	10.0	7.0	126.01	7.1	-130.	20	HI
44 03 09	103 14 38 KUH40	165.	87.3	-0.4	A63005	241.1	27.	1.0	
S08961: SOUTH DAKOTA STATE RADIO COMMUNICATIONS 72 CH MSG RCN:									
6785.0000H									
EQUIPMENT: 2JRQ01 EMISSION: 10000F9									
2	MT COLLIDGE SDKBHE TV BLDGSD	6010.	10.0	7.0	142.13	45.2	-131.	20	LO
43 44 43	103 28 50 KUH38	323.	4.7	14.7	A63005	214.0	26.	1.0	
S08961: SOUTH DAKOTA STATE RADIO COMMUNICATIONS 72 CH MSG RCN:									
6615.0000V									
EQUIPMENT: 2JRQ01 EMISSION: 10000F9									
3	CAMP RAPID SDKBHE TV BLDGSD	3350.	10.0	7.0	126.85	7.8	-135.	20	LO
44 04 54	103 15 50 KUH36	17.	294.9	-4.3	A63005	268.7	22.	1.0	
S08961: SOUTH DAKOTA STATE RADIO COMMUNICATIONS 72 CH MSG RCN:									
6635.0000H									
EQUIPMENT: 2JRQ01 EMISSION: 10000F9									
4	MT TERRY SDKBHE TV BLDGSD	7028.	10.0	7.0	144.57	59.9	-137.	20	LO
44 19 38	103 50 06 KUH23	190.	354.0	12.7	A63005	297.1	20.	2.0	
S08961: SOUTH DAKOTA STATE RADIO COMMUNICATIONS 72 CH MSG RCN:									
6595.0000V									
EQUIPMENT: 2JRQ01 EMISSION: 10000F9									
5	KBHE TV BLDGSDMT TERRY SD	3836.	10.0	7.0	126.01	7.1	-144.	20	HI
44 03 09	103 14 38 KUH40	385.	117.9	-13.5	A64006	241.1	13.	1.0	
S08961: SOUTH DAKOTA STATE RADIO COMMUNICATIONS 72 CH MSG RCN:									
6745.0000V									
EQUIPMENT: 2JRQ01 EMISSION: 10000F9									
6	KBHE TV BLDGSDMT COLLIDGE SD	3836.	10.0	7.0	126.01	7.1	-145.	20	HI
44 03 09	103 14 38 KUH40	385.	211.8	-15.3	A63005	241.1	12.	1.0	
S08961: SOUTH DAKOTA STATE RADIO COMMUNICATIONS 72 CH MSG RCN:									
6765.0000V									
EQUIPMENT: 2JRQ01 EMISSION: 10000F9									
7	TEAKETTLE R WYPRAIRIE CTR WY	4855.	10.0	7.0	155.49	210.5	-146.	30	LO
42 20 06	104 09 55 WHJ457	30.	6.2	13.7	A63130	203.0	11.	1.0	
S01910: CHICAGO & NORTH WESTERN TRANSPORTATION 480 CH MSG RCN:									
6635.0000V									
EQUIPMENT: 2ZJN01 EMISSION: 10000F9									

TABLE 2.2.2-1 INTERFERENCE CONFLICTS

Table 2.2.3-1 presents a summary of potential interference conflicts after the over-the-horizon losses are considered. An explanation of the column headings for the table follows:

Description of Interference Case Summary Column Headings

Path ID -	Case Number - Victim Receiver - Transmitter
Band -	Frequency band with high or low portion of the receive band identified.
Distance (Km) -	Distance between the earth station and the involved terrestrial station in kilometers.
Azimuths (degrees)	Azimuth in degrees from true north from the earth station to the involved terrestrial station.
ES Discrimination - Angle (degrees)	Earth Station Discrimination angle in degrees towards the involved terrestrial station.
ES Gain -	Gain of the earth station in dBi at the calculated Earth Station discrimination angle.
Los Loss Required - (dB) -	Loss above free space loss required to resolve the case.
OH Loss -	Over-the-horizon losses greater than free space as calculated in Table 2.2.3-2 for 20 percent and .0025 percent of the time.
Revised Margin -	The long term 20% and short term .0025% time margins to the interference objective. Negative margins indicate that the path is clear of interference.

TABLE 2.2.3-1  
INTERFERENCE CASE SUMMARY  
RAPID CITY, SD OPERATIONAL FIXED BAND 6.7 GHZ

PATH ID	BAND	DIST (KM)	AZ (DEG)	ES DISC (DEG)	ES GAIN (DBI)	LOS REQ'D (DB)	LOSS		OH LOSS 20% 0.0025%	REVISED MARGIN	
										20% 0.0025%	0.0025%
1. KBHE TV BLDGCAMP RAPID	6H	7.1	241.1	10.0	7.0	26.6	0.0	0.0	26.6	3.6	
2. MT COLLIDGE KBHE TV BLDG	6L	45.2	214.0	10.0	7.0	25.6	0.0	0.0	25.6	2.6	
3. CAMP RAPID KBHE TV BLDG	6L	7.8	268.7	10.0	7.0	21.8	26.8	25.3	CLEAR	CLEAR	
4. MT TERRY KBHE TV BLDG	6L	59.9	297.1	10.0	7.0	20.2	35.5	24.4	CLEAR	CLEAR	
5. KBHE TV BLDGNT TERRY	6H	7.1	241.1	10.0	7.0	13.4	0.0	0.0	13.4	CLEAR	
6. KBHE TV BLDGNT COLLIDGE	6H	7.1	241.1	10.0	7.0	11.7	0.0	0.0	11.7	CLEAR	
7. TEAKETTLE R PRAIRIE CTR	6L	210.5	203.0	10.0	7.0	11.2	62.8	37.7	CLEAR	CLEAR	
8. HAYES BILLSBURG	6L	154.6	77.4	10.0	7.0	10.8	53.9	20.7	CLEAR	CLEAR	
9. FT PIERRE HAYES	6H	205.2	79.9	10.0	7.0	9.3	56.4	28.4	CLEAR	CLEAR	
10. DAWES CDSP PASSIVE	6H	158.0	173.2	10.0	7.0	4.7	100.1	65.6	CLEAR	CLEAR	
11. DAWES CT HS PASSIVE	6L	140.2	174.4	10.0	7.0	-0.4	0.0	0.0	CLEAR	CLEAR	
12. HEMINGFORD HAY SPRINGS	6L	199.7	173.4	10.0	7.0	-0.5	0.0	0.0	CLEAR	CLEAR	
13. DOUGLAS SHAWNEE	6L	195.6	247.6	10.0	7.0	-0.9	0.0	0.0	CLEAR	CLEAR	
14. SHAWNEE DOUGLAS	6H	206.9	228.3	10.0	7.0	-1.4	0.0	0.0	CLEAR	CLEAR	

ANTENNA TYPE : FCC REFERENCE, 32 - 25LOG (THETA)

SATELLITE ARC : 0 - 359 DEGREES

OBJECTIVES : -154.0 DBW -131.0 DBW

### 3.0 Results

This section summarizes the results of the analyses presented in Appendix A through Appendix F which includes all the downlink and the uplink studies performed. The summary includes some tabulated results on the number of analyzed cases and their success rate in satisfying the interference criteria. In our analysis we will address the magnitude and the diverse variety of terrestrial receivers analyzed on which our conclusions were based.

The results section will discuss the application of additional common techniques to mitigate the outstanding cases. The need for any additional analyses will be specified as well.

#### 3.1 Downlink Analysis Results

##### 3.1.1 Private Operational Fixed Microwave 6525-6875 MHz Frequency Band

The selected areas presented a wide variation of operational parameters and modulation schemes. Receiving equipment included parabolic antennas, passive reflectors, and periscope antennas. A wide class of digital and analog radios were encountered. The digital samples included equipment from several manufacturers as well as, a large sample of high capacity radios. The analog radios varied in capacity from 12 to 900 FM/FDM channels, with the 600 channel FM/FDM claiming the larger portion of the count. The FM/Video cases were scarce, identifying a known trend of the lack of deployment in this band (The FCC, except, on a waiver basis, does not allow FM/Video since this usually requires more than 10 MHz while the licensed bandwidth may not exceed 10 MHz).

The variation of terrain and antenna heights exhibited a very good variation of tilt angles at both ends of the terrestrial path. Generally, the paths exhibited sufficiently high fade margins (or link budget).

Table 3.1.1-1 presents the overall summary of the cases analyzed in the 6525 - 6875 MHz frequency band.

	Total Number of Cases	Met Objective	Unresolved
Analog Message Traffic	1328	1289 (97.1%)	39
Digital Traffic	558	374 (67.%)	184
FM/Video	36	32 (88.9%)	4
Total	1922	1695 (88.2%)	227
<p>Table 3.1.1-1 Summary of Cases Analyzed for the 6525 - 6875 MHz OFS Band</p>			

Of the total number of cases 88.2 percent met the interference objectives. There are 11.8 percent of the cases analyzed that still to be resolved.

Table 3.1.1-2 presents a summary of the unresolved cases.

	0-1 dB	1-2 dB	2-3 dB	3-6 dB	6-10 dB	>10 dB
Analog FM/FDM	10	10	4	11	2	2
Digital	73	40	44	22	4	1
FM/Video	-	2	-	1	1	-
% of Total (227 Cases)	36.6	22.9	21.1	15.0	3.1	1.3
Category Total	83	52	48	34	7	3
<p>Table 3.1.1-2 Distribution of Unresolved Cases All Areas for 6525-6875 MHz OFS Band</p>						

Table 3.1.1-2 shows that 80.6% of the unresolved cases were within 2 to 3 dB of the interference objective. The remaining, 19.4% exceed the objective by more than 3 dB. Two of the three cases which were greater than 10 dB involve passive reflectors, which implies that further refined analysis is needed. The majority of the cases in the 3-6 dB range were within 5 dB, while 50% of the 2-3 dB digital cases were into 3DS3 receivers which have a more stringent objective than a single DS3 by 5 dB.

The conservative analysis conducted clearly implies that at least 19.4% of the unresolved cases require more refined analysis. Three very important extensions are suggested below:

1. Time exposure estimates. Since the satellites are mobile, the duration of interference will not be 100% of the time. Thus, depending on how long the satellite is injecting interference into an OFS digital (or analog) user, the predicted outage for a given path may change. Dependent on the current path reliability, the satellite's marginal interference could affect that path to various degrees.
2. Employ the azimuthal discrimination with the proposed mobile satellite system. One of the two leading interference reduction techniques in a shared band is improved antenna directivity (the second is terrain or man-made obstruction loss). As we deploy the applicable orbit mechanics, the exact orbit's azimuths towards the OFS station are defined. The orbit, therefore the satellite, may fall at a large enough discrimination angles where the antenna's directivity are much better than worst case situation analyzed in this report.
3. Consideration of clutter.

The advantage of the clutter is that it blocks the satellite view from the OFS antenna main beam, thus forcing the coupling to be at a higher elevation angle. This higher elevation angle implies much lower OFS antenna gain, thus reducing the interference potential.

Generally, terrain distributed losses are relied on to enable heavy frequency reuse in these bands.

3.1.2 Downlink Analysis Results for Auxiliary Broadcast  
6875 - 7125 MHz Frequency Band

The results of the analysis are summarized by Table (3.1.2-1).

Area	Total Number of Cases	Met 66 dB C/I	Met 54 dB C/I	Unresolved 66 dB for C/I	Unresolved 54 dB for C/I
Columbus, OH	104	104	104	0	0
Washington, DC	60	66	60	5	0
Chicago, IL	48	46	48	2	0
San Mateo, CA	134	133	133	1	1
New Orleans, LA	13	13	13	0	0
Total	359	351	358	8	1
Table 3.1.2-1 Point-to-Point Auxiliary Broadcast Results for Five Areas for the 6875-7125 MHz Auxiliary Band					

Table 3.1.2-1 shows a small number of cases which didn't meet the long haul (and medium haul) interference objective. There were a total of 359 paths analyzed in this study. These were 97.8 percent of the paths that satisfied the long haul objective of 66 dB.

The short haul objective (54 dB) was met in 99.7 percent of the cases and the only case above the short haul objective had a C/I level of 53.1 dB.

The interference objective, as given in Appendix D, for the carrier to interference power ratio, C/I, is low compared to other modulations. Thus, allowing the studied cases to more easily meet the objective than with other modulations. Furthermore, the eight outstanding cases could be further investigated in order to determine whether they need to be treated with a long (or medium) haul objective. For example, if the use of these paths is for STL application, they can be treated as short haul. See Appendix D.

The results also show that the density of point-to-point paths is not as great in the Auxiliary Broadcast band as in the OF band for the areas analyzed. The highest number of paths is 149 paths in San Mateo area. Though these numbers are not high, one has to include the ENG utilization in this band. The ENG follow a 54 dB C/I criteria, according to the analysis given in Section 2.1.2.1 Appendix D shows that for several ENG configurations the 54 dB C/I can be met.

	0-1 dB	1-2 dB	2-3 dB	3-6 dB	6-10 dB	>10 dB
Long Haul	4	1	1	0	1	1
Short Haul	1	0	0	0	0	0
<p style="text-align: center;">Table 3.1.2-2 Distribution of Unresolved FM/Video Cases for Long Haul and Short Haul Interference Objectives</p>						

Table 3.1.2-2 indicates that 75 percent of the unresolved long haul cases are within 3 dB of the objective and there is only one case unresolved for the short haul objective of 54 dB.

The results of the analysis indicate that additional studies are required to further quantify the impact of the downlink on the Auxiliary Broadcast systems if the systems are to be considered long haul.

**3.1.3 Results of Auxiliary Broadcast, Cable Television Relay Services (CARS) Terrestrial Fixed Service in the 12750 - 13250 MHz Band**

The total number of cases analyzed and the results are summarized in Table 3.1.3-1.

Summary of Video Cases				
Area Analyzed	Total Number of Cases	Unresolved 25 MHz FM/Video 54 dB	Unresolved 12.5 MHz FM/Video 57 dB	Unresolved 6 MHz AM/Video 61 dB
Tampa, FL	71	0	0	5
Washington, DC	245	0	0	4
Chicago, IL	190	1	1	0
San Mateo, CA	266	0	0	1
New Orleans, LA	65	0	0	1
Total	837	1	1	11
<p>Table 3.1.3-1 Case Summary for 5 Major Areas in the 12750 -13250 MHz Band</p>				

Of the 837 cases analyzed 98.4 percent met the short haul interference objectives.

Table 3.1.3-2 lists the number of cases and the range of levels that need to be resolved for the relevant modulations and their corresponding bandwidth.

	0-1 dB	1-2 dB	2-3 dB	3-6 dB	6-10 dB
6 MHz VSB AM/Video	3	5	1	1	1
12.5 MHz FM/Video	0	0	0	0	1 <sup>(1)</sup>
25 MHz FM/Video	0	1	0	0	0
% of Cases Missing Objectives (13)	18.2%	45.5%	9.4%	18.21 %	9.0%
% of Total Case Analyzed (837)	0.3%	0.7	0.11	0.22	0.11
Table 3.1.3-2 C/I Case Distribution for Five Major Areas in the 12750 - 13250 GHz Band					
Note (1) 16.6 dB case.					

Table 3.1.3-2 shows very few cases which did not meet the objective. The large number of cases which met the objective could be attributed to the low C/I requirements (54 dB) for short haul 13 GHz systems. The VSB AM/Video required a higher C/I ratio of 61 dB. The 61 dB coupled with very low receive carrier level, gave rise to the reported cases. The case within the 3-6 dB range missed the objective by 3.1 dB.

In the 6-10 dB range one case missed the objective by 7.3 dB. This case has an exceptionally low receive carrier level of -54.2 dBm, which is about 9 dB lower than the average of -45 dBm. There was one 12.5 FM/Video MHz case that is 16.6 dB from the objective.

Generally, in this band if the carrier level is low and the receiving antenna is pointing up without attaining any discrimination towards the satellite, the calculations acknowledge the possibility of missing the interference objective.

Similar interference reduction techniques can be applied as given in Section 3.1.1.

### 3.1.4 Results of ENG Analysis 6425-6525 MHz, 6785 - 7125 MHz and 12.75 - 13.25 GHz Bands

#### 3.1.4.1 Summary of Approach and Analysis

Due to the lack of data detailing the specific parameters utilized and encountered for ENG operations, we have taken a different approach to analyze the potential for sharing the spectrum between a Globalstar downlink and ENG services.

After research of available hardware and current frequency band utilization, we have selected four (4) different ENG configuration which have a representative sample of ENG system parameters. For these configurations, we have calculated the maximum interference power from one Globalstar satellite. The interference power was utilized to calculate the C/I with the different performance levels of each ENG configuration.

The performance bench mark was the thermal fade margin of an ENG path. By varying the thermal fade margin, one will equivalently be introducing obstruction loss (or obstruction fading) to the ENG system. Upon varying the thermal fade margin, an assessment of the interference effects on the S/N were carried out.

### 3.1.4.2 Summary of ENG Results

Table 3.1.4.2-1 given below summarizes Appendix D findings

Frequency Band	Configuration <sup>(1)</sup>	Interference (dBm)	Fade Margin (dB)	C/I (dB)	C/I Objective (dB)	Interference S/N (dB) <sup>(2)</sup>
6425-6525 MHz and 6725-7125 MHz	Four 90° Sectorized Antennas	-129.9	34	79.9	54	Very Large
		-129.9	8.1	54	54	77.4
		-129.9	0	45.9	54	69.3
6425-6525 MHz and 6785-7125 MHz	Offset Fed Parabola (3"x 2")	-114.9	34	64.9	54	Very Large
		-114.9	23	53.9	54	77.3
		-114.9	0	30.9	54	54.34
6425-6525 MHz - 6725-7125 MHz	CSC <sup>2</sup> 1.4 m	-108.9	34	58.9	54	Very Large
		-108.9	29	53.9	54	77.3
		-108.9	0	24.9	54	48.3
12.75-13.25 GHz	6 Ft. Diameter Parabolic	-99.6	45	61.6	54	Very Large
		-99.6	37.4	54	54	77.4
		-99.6	0	16.6	54	40.9
Table 3.1.4.2-1 Summary of ENG Analysis						
Note 1:	All configurations assume a 25 MHz receiver and FM/Video modulation.					
Note 2:	S/N = C/I + 23.44 (dB)					

As shown in Table 3.1.4.2-1, all the required C/I power ratios are satisfied for nominal and sub-nominal fade margins. Upon instantaneous fades consuming the entire fade margin (or link budget), the 7 GHz configurations will barely exhibit any impact from the corresponding interference levels. The 13 GHz configuration will suffer 0.5 dB degradation (i.e., S/N = 29.5 dB). All of these analyses assume that the ENG fading coincides with the satellite presence within the mainbeam of the given antenna configuration. A probability or time duration development is very complex due to the variation of ENG events and the randomness of the fading environment.

### 3.2 Uplink Analysis Results

Interference analyses were performed for two different locations. The sites chosen are representative of a non-congested area and a congested area. The frequency bands considered were 6525 - 6875 MHz C-band and the 10.7 to 10.95, 11.2 to 11.45 GHz Ku-band. A summary Table 3.2-1 shows the number of cases for each site and frequency band.

Site	Frequency Band GHz	Cases Analyzed	Unresolved Cases after O-H Losses	Cases Resolved with 15 dB Shield	Unresolved Cases
Rapid City, SD <sup>(1)</sup>	5.925-6.425	14	2	0	2
Staten Island, NY	5925-6425	351	52	33	19
Rapid City, SD <sup>(1)</sup>	10.7-11.45	3	3	0	0
Staten Island, NY	10.7-11.45	191	13	8	5
<sup>(1)</sup> Non-congested area site					
Table 3.2-1 Summary of Interference Cases for Uplink					

Table 3.2-1 distinctly shows the difference between the 6 GHz and the 11 GHz bands. The 6 GHz band shows a larger number of cases than the 11 GHz band, in both congested and non-congested areas. In both bands, the congested area site, Staten Island shows a much higher number of cases versus the Rapid City, the non-congested area site. Table 3.2-1 also reflects the effectiveness of the terrain attributed losses, (over-horizon-loss, OH loss), in resolving the interference cases. Generally, a well selected site will manifest one or more of the following characteristics: sufficient discrimination angles with the surrounding terrestrial stations; sufficient distance from the surrounding terrestrial stations; and sufficient OH losses.

The shielding effectiveness needs to be proportional to the cases' severity. For example, at Rapid City, a 15 dB shielding loss will not resolve the predicted cases, even after applying the OH loss. Generally, the following standard interference mitigation techniques, in congested and non-congested areas, could be employed to resolve the remaining cases:

1. Reduce the transmission power density of the Globalstar system in a portion of the 6525-6875 MHz band.